DOCUMENT RESUME

ED 306 405 CE 052 368

AUTHOR Smith, David Lawson
TITLE Comparative Costs of Occupational and General Education, Grades 9-12 in Nevada.
INSTITUTION Nevada State Dept. of Education, Carson City. Planning, Research and Evaluation Branch.
PUB DATE Mar 89
NOTE 19p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Education; Comparative Analysis; *Educational Finance; *Expenditure per Student; High Schools; *Program Costs; School Statistics; State Surveys; Statewide Planning; *Vocational Education
IDENTIFIERS *Nevada

ABSTRACT

A study compared statewide per-student costs of providing occupational and academic education in Nevada in grades 9-12. The variables compared were teacher salaries, consumable supplies, equipment, and maintenance and repairs. Results indicated that it cost Nevada 62.98 percent more to provide these educational services to the occupational student than to the academic student. Teacher salaries and benefits averaged $2,796.13 per full-time equivalent (FTE) occupational student compared to $1,791.46 per FTE academic student. Expenditures for consumable supplies, equipment, and equipment repair and maintenance averaged $261.47 per FTE occupational student compared to $84.60 per FTE academic student. Findings paralleled previous research showing a substantial added cost per student for providing occupational education services and supported the proposal for establishing a stable source of funding support to provide for the additional costs of Nevada's occupational education programs in grades 9-12. (An illustration of additional funding to cover the added costs of occupational programs statewide is provided using the per-pupil allocations from the Nevada Distributive School Fund. The instrument is appended.)
(Author/YLB)

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COMPARATIVE COSTS OF OCCUPATIONAL AND GENERAL EDUCATION, GRADES 9-12 IN NEVADA

David Lawson Smith, PhD

Occupational Research Unit
Planning, Research, and Evaluation Branch
Nevada Department of Education

CE 052 368

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Abstract

The present study compares statewide per-student costs of providing occupational and academic education in Nevada in grades 9-12. The variables selected for the comparison are teacher salaries, consumable supplies, equipment, and maintenance and repairs. Using these variables as representative indicators of costs, it costs Nevada 62.98% more to provide these educational services to the occupational student than to the academic student. Teacher salaries and benefits average $2,796.13 per full-time equivalent (FTE) occupational student compared to $1,791.46 per FTE academic student. Expenditures for consumable supplies, equipment, and equipment repair and maintenance average $261.47 per FTE occupational student compared to $84.60 per FTE academic student. These findings parallel previous research showing a substantial added cost per student for providing occupational education services. An illustration of additional funding to cover the added costs of occupational programs statewide is provided using the per-pupil allocations from the Nevada Distributive School Fund.

The educational community has been aware for some time that the costs of providing students with occupational education services exceed the costs of similar levels of academic education services. In a review of literature from various states (Arizona, Utah, Oklahoma, Idaho, Oregon, and Texas), Bandera (Reardon, 1984) isolated contributing variables and methods for calculating the "added" costs of providing occupational education. Based upon Bandera's work, Stamps (1987) conducted a statewide comparison cost study of occupational and academic education, grades 9-12, in Nevada. His study looked at the impact of seven variables: student/teacher ratio; teacher salary per pupil; consumable supplies; equipment; facilities; maintenance and repair; and miscellaneous expenses. He found that the costs of providing equivalent levels of educational services were 52% greater per pupil for occupational education than academic education.

The present study replicates the work by Stamps with some revisions. Like its predecessor, the present study focuses on comprehensive high schools and area vocational centers. Both studies are relevant to recommendations for added cost reimbursement to school districts for their occupational education programs.

Given the latter consideration, however, the costs for facilities and for miscellaneous expenses are not included in the present study since they constitute less stable sources of yearly expense. Also, statewide results reported in the present study are based on calculations performed upon statewide data rather than an unweighted averaging of statistics from each district. The present procedure should result in more accurate information on statewide costs since the impact of each school district will be proportional to its student population. Finally,

general business courses (i.e., Introduction to Business, Business Law, Business Math, and Typing I) were not counted as occupational courses in the present study. This method is consistent with Nevada's Occupational Reporting System that provides yearly teacher and student enrollment information for state and federal purposes. Other business courses that provide more specific management, accounting, and advanced office skills courses are included in occupational education data here.

Method

In January 1989, administrative personnel from 16 Nevada school districts and the Nevada Youth Training Center (Nevada Girls' Training Center data were supplied by Lincoln County School District) were sent a survey instrument requesting the following information for occupational education and for general (academic) education in grades 9-12:

a. total unduplicated enrollments;

b. total number of full-time teachers;

c. total salaries for full-time instructional staff; and

d. yearly costs for consumable supplies, equipment, and equipment maintenance and repair.

Once the data were received, district personnel were contacted to verify the figures submitted and that instructions were followed. The definitions and computational procedures used in responding to the survey were a variant of those used in the previous study. They appear in the Appendix. Special education data were not included in computations.

The enrollment calculations provide the equivalent of the number of students taking a full-course load of either occupational or general education courses (Full-Time Equivalence). Teachers were assigned to either occupational or general education based upon their principle

assignment (as defined in periods taught). In some cases, school districts reported teachers with various assignments as proportions of their courses taught in either occupational or general education. The appropriate proportions of those teachers' salaries were assigned to either occupational or general education. Teacher salaries for each district were calculated prior to additional dollar amounts for retirement and fringe benefits and then were increased by .2492 to cover the costs of these benefits. The latter amounts are reported here. The proportional increase used here (i.e., .2492) is consistent with the figure used in the Distributive School Account for fiscal years 1990 and 1991. Finally, textbook costs were not included in consumable supply costs.

Results

Instructional Staff

The statewide student to teacher ratios for grades 9-12 were 14.71:1 for occupational education and 20.92:1 for general education. In other words, occupational teachers taught approximately 30% fewer students on average than general education teachers, statewide. The statewide average costs per pupil for instructional salaries, retirement, and benefits were $2,796.13 for occupational education and $1,791.46 for general education. Thus, instructional staff costs of providing the individual student with occupational education were approximately 56% greater than the costs of providing general education instructional staff to the individual student. The statistics for each district appear in Table 1.

Other Costs

Analyses in this section did not include data from Austin High

Table 1

Student-Teacher Ratios and Instructional Staff Costs Per Pupil

School District[1]	Occupational		General	
	Ratio	Costs	Ratio	Costs
Carson City	13.90:1	$ 2038.52	18.08:1	$1766.59
Churchill	14.40:1	3154.86	25.05:1	1540.74
Clark	18.62:1	2211.83	23.31:1	1709.48
Douglas	15.20:1	2526.83	20.28:1	1958.14
Elko	9.92:1	3572.41	17.03:1	2108.39
Eureka	3.20:1	10933.92	6.91:1	5311.69
Humboldt	6.91:1	6409.57	13.92:1	2454.14
Lander	13.86:1	3075.70	13.83:1	1782.57
Lincoln[2]	7.29:1	4650.52	7.15:1	4436.47
Lyon	12.38:1	2857.94	17.07:1	2093.44
Mineral	13.00:1	3008.15	18.08:1	2298.42
Nye	6.92:1	3489.00	17.20:1	1574.20
Pershing	10.00:1	3645.03	14.80:1	2359.55
Storey	6.14:1	5833.22	7.60:1	4987.37
Washoe	12.09:1	4845.26	20.25:1	1753.88
White Pine	11.60:1	3079.72	16.75:1	2207.08
NYTC	10.33:1	2878.26	10.08:1	3304.01

[1]Except NYTC
[2]Includes data from Nevada Girls' Training Center

School since they were unable to report either general education costs for grades 9-12 or occupational education costs broken down into the present categories.

From the data reported, the statewide average costs per pupil for consumable supplies were $162.44 for occupational education and $47.57 for general education. This represents an approximate 241% added cost for providing consumable supplies to the occupational student. Likewise, the average statewide equipment costs per pupil were $47.67 for occupational education and $13.92 for general education, reflecting a roughly 242% added cost for the occupational education student. The average costs per pupil for equipment maintenance and repair were $51.36

for occupational education and $23.11 for general education, an approximate 122% added cost for the occupational education student.

The averages for each district appear in Table 2. Caution should be taken in making comparisons across school districts. Unlike statewide averages which should be relatively stable, expenditures for individual districts may vary depending upon such factors as student population, previous years' expenditures, and a district's capacity to do much of their own repairs.

Overall Costs

The comparison of occupational education and general education on average statewide costs per pupil for each of the four variables included

Table 2

Costs Per Pupil for Supplies, Equipment, and Maintenance

School District[1]	Occupational Education			General Education		
	Suppl.	Equip	Repair	Suppl.	Equip	Repair
Carson	$ 143.98	$ 73.17	$ 11.59	$ 55.75	$ 6.71	$ 12.28
Churchill	150.51	36.55	65.69	183.83	69.24	25.56
Clark	143.96	25.58	62.86	44.25	11.32	34.04
Douglas	263.29	67.76	38.82	44.85	8.99	14.40
Elko	180.26	37.48	28.13	60.78	15.98	7.75
Eureka	1039.39	273.52	70.02	449.19	272.57	73.27
Humboldt	332.89	195.39	79.61	61.44	18.04	5.29
Lander[2]	94.83	43.10	25.86	52.64	52.08	4.17
Lincoln[3]	222.26	209.56	95.06	147.14	86.46	18.65
Lyon	119.71	49.09	38.74	50.08	13.94	13.96
Mineral	185.65	119.68	197.69	149.42	59.34	26.59
Nye	141.80	78.31	3.61	69.97	9.25	1.85
Pershing	550.00	133.33	83.33	175.68	94.60	33.78
Storey	146.58	846.91	162.87	216.87	88.10	20.23
Washoe	155.93	88.06	8.88	22.93	7.93	1.83
White Pine	554.31	4.31	6.03	97.01	26.87	20.90
NYTC	159.85	83.06	40.32	193.36	130.59	39.67

[1]Except NYTC
[2]Excludes data from Austin High School
[3]Includes data from Nevada Girls' Training Center

in this study (Instructional Salaries, Consumable Supplies, Equipment, and Maintenance/Repair) is illustrated in Figures 1 and 2. Combining the average cost per pupil, the information submitted indicates that the average statewide cost of these variables for occupational education was $3,057.60 per student. The comparable cost of these variables for general education was $ 1,876.06. If these variables can be taken as valid indicators of overall cost differential, the results of the present study suggests that it costs approximately 62.98% more to provide services to the individual occupational education student than it does to provide comparable services to the individual general education student.

Discussion

Like previous research on the issue, the present study suggests that, for grades 9-12, the costs of providing the individual student with occupational educational services exceed considerably the costs of providing services for general education. Student to teacher ratios are lower for occupational education, and, therefore, instructional salary cost per student is higher. Likewise, per student costs for consumable supplies, equipment, and equipment repair and maintenance are considerably higher for occupational education.

Two principle differences from the findings of Stamps' (1987) study of comparative costs in Nevada are noteworthy. First, the numbers of full-time equivalence occupational students in grades 9-12 are lower in the present study. This is due, in part, to instructions not to count general, introductory business courses in occupational enrollment counts. Another, potential influence is the decrease in the number of class sections in Nevada's secondary occupational education programs (Nevada Department of Education, 1987). However, given population increases and

Figure 1.

Statewide Costs Per Student
Average Teacher Salaries
Grades 9-12, 1989

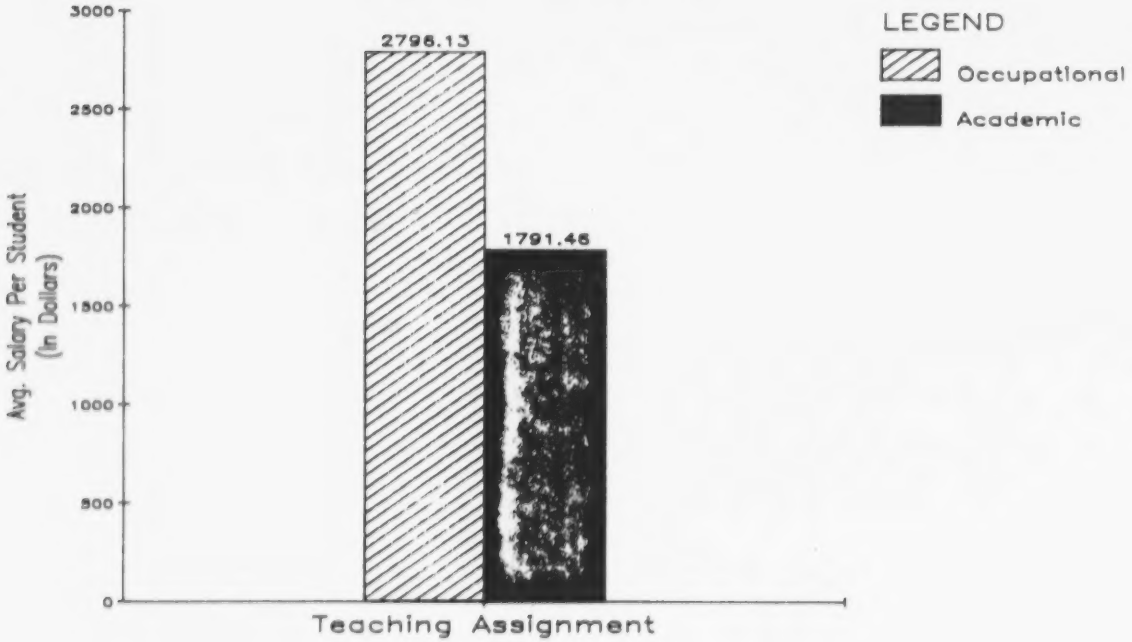
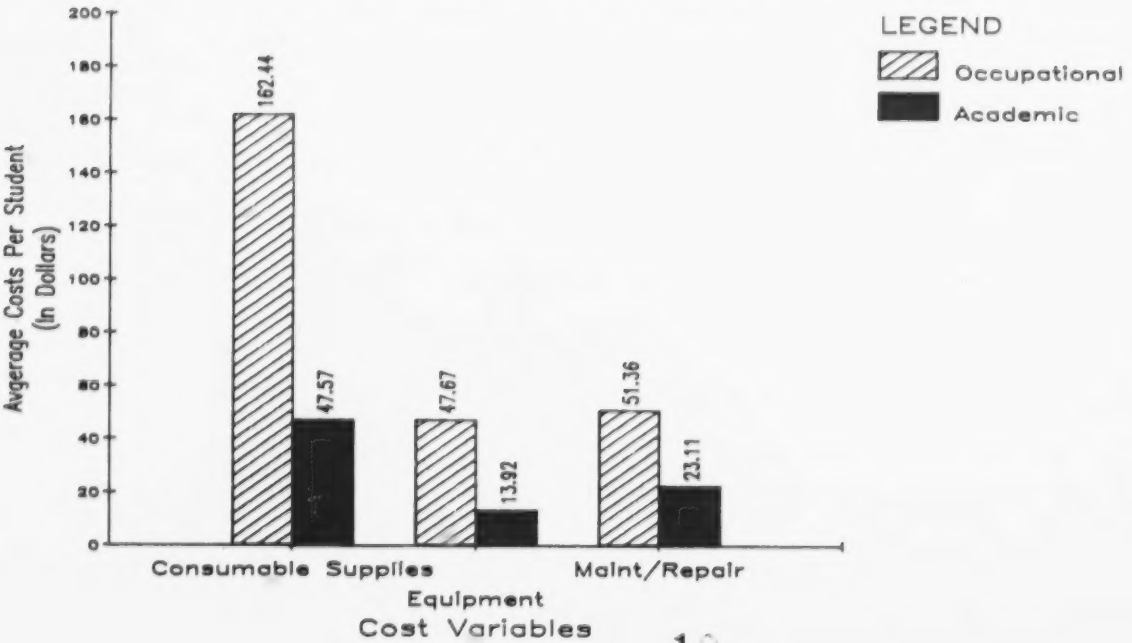


Figure 2.

Statewide Costs Per Student
Occupational Vs. Academic
Grades 9-12, 1989



efforts to diversify Nevada's economic base, these decreases in occupational education enrollments may signal a need to consider avenues for increasing the number of occupationally trained individuals available in Nevada's workforce.

Second, the comparative cost factor (+62.98%) per student of providing occupational education in grades 9-12 is greater in the present study than in Stamps' study (+52%). The bulk of the difference between the two studies appears to be accounted for by the influence of student to teacher ratios on the average teacher salary per FTE student. In this regard, student to teacher ratios in such business classes as Introduction to Business, Business Law, and Business Math are likely to be more comparable to academic classroom courses than to many occupational courses, such as homemaking, mechanical repair, construction trades, and precision production. Locating the data for such business courses in general, rather than occupational, education should result in a decrease in occupational education student to teacher ratios and an increase in per student instructional costs.

The present findings support the proposal in previous research for establishing a stable source of funding support to provide for the additional costs of Nevada's occupational education programs in grades 9-12. Using basic support per pupil for the 1988-1989 school year, the comparative cost figure from the present study, and full-time equivalent enrollments in occupational education, Table 3 provides an illustration of the potential costs of addressing such a proposal in Nevada.

Table 3

Basic Support Funding for Nevada's Occupational Education Programs, Grades 9-12 (in Whole Dollars)

School District[1]	1988-1989 Basic Support Per Pupil	Percent Add. Cost Per Pupil	Occ. Ed Add. Cost Per Pupil	FTE Occ. Ed Students[2]	Total Add. Cost Per District
Carson	$2925	62.98	$1842	292	$ 537,864
Churchill	3019	62.98	1901	144	273,744
Clark	2582	62.98	1626	3146	5,115,396
Douglas	2687	62.98	1692	152	257,184
Elko	3068	62.98	1932	258	498,456
Eureka	3692	62.98	2325	9	20,925
Humboldt	2919	62.98	1838	76	139,688
Lander	3106	62.98	1956	60	117,360
Lincoln	4793	62.98	3019	74	223,406
Lyon	3343	62.98	2105	146	307,330
Mineral	3222	62.98	2029	65	131,885
Nye	3047	62.98	1919	83	159,277
Pershing	3035	62.98	1911	30	57,330
Storey	4260	62.98	2683	6	16,098
Washoe	2444	62.98	1539	585	900,315
White Pine	3525	62.98	2220	58	128,760
NYTC	3229[3]	62.98	2034	62	126,108
STATEWIDE ADDED COST FUNDING FOR OCCUPATIONAL EDUCATION					$9,011,126

[1]Except NYTC
2Rounded to nearest whole number
[3]Average of the district basic support per pupil figures

References

Nevada Department of Education. (1987). Occupational education enrollment decline: The decline of occupational education opportunity in Nevada high schools. Carson City, NV.

Reardon, M. R. (1984). Added cost reimbursement for vocational education programs in comprehensive high schools and area vocational centers in Nevada: A feasibility study. Unpublished manuscript. University of Nevada, Reno.

Stamps, C. A. (1987). Statewide comparative costs study between occupational and academic education, grades 9-12 in Nevada. Carson City, NV: Nevada Department of Education.

Appendix

DIRECTIONS AND DEFINITIONS TO BE USED WHEN COMPLETING THE COST-COMPARISON STUDY

PLEASE NOTE: This study covers Grades 9-12 ONLY . Do not include enrollments, teachers, or costs for any other grade level.
Use information from school year 1988-1989 to complete the questionnaire.

1. TOTAL OCC ED STUDENTS and TOTAL GEN ED STUDENTS

OCCUPATIONAL EDUCATION STUDENT - For the purpose of this study, the count of occupational education students is not a count of the number of students taking one or more occupational classes. Rather, it is the equivalent of a grade 9-12 student taking a full-time occupational education courseload (i.e., 6-7 hours/periods of occupational education, depending upon the district's number of class periods per day). For example, in a district where a full day is six periods, three students, each of whom are taking two periods of occupational education, would be counted as one full-time occupational education student.

GENERAL EDUCATION STUDENTS - Like the definition above, this is not a count of the number of students taking general education classes. Rather, it too is the equivalent of a grade 9-12 student taking a full-time general education courseload (6-7 hours periods, depending upon the district). In a six-period district, one student taking four periods of general education and another student taking two periods would combine to make one full-time general education student.

OCCUPATIONAL EDUCATION CLASSES (Grades 9-12 only) - Count students enrolled in job-specific occupational courses or occupational courses that are general, career, or exploratory. Count students enrolled in consumer and homemaking courses and students enrolled in industrial arts. Count special education students who are enrolled in mainstreamed occupational education programs.

Do not count students enrolled in general business courses (i.e., General Business, Introduction to Business, Typing I, Business Law, and Business Mathematics). Do not count special education students in self-contained classes or resource rooms.

GENERAL EDUCATION CLASSES (Grades 9-12 only) - Count students enrolled in all other programs, including general business courses, and count special education students enrolled in mainstreamed general education programs.

Do not count special education students in self-contained classes or resource rooms.

TO CALCULATE TOTAL OCCUPATIONAL/GENERAL EDUCATION STUDENTS:

A. Use Grades 9-12 fall enrollment data from the last day of the first school month of the current school year.
B. Collect class enrollment sheets for all classes taught in the school.
C. Remove class enrollment sheets for all self-contained (or resource room taught) special education classes.
D. Separate remaining class enrollment sheets into two sets: one for occupational education classes (see definition above) and one for the general education classes (see definition above).
E. Tally enrollments in each set. For courses that span two hour periods, count their enrollments twice (e.g., 15 students enrolled in a two-hour block should be counted as 30 as if they were enrolled in 2 one-hour courses). If there are any three-hour courses, count their enrollments three times.
F. Divide the totals for each set by the number of class periods per day and enter each amount in the appropriate space on the questionnaire.

2. TOTAL OCC ED TEACHERS and TOTAL GEN ED TEACHERS

TOTAL OCCUPATIONAL EDUCATION TEACHERS - Count all full-time (five or more courses/hours per day) teachers who teach three or more classes/hours per day in any of the job-specific, general occupational, industrial arts, or consumer and homemaking program areas. Do not count special education teachers.
Enter this total on the questionnaire.

TOTAL GENERAL EDUCATION TEACHERS - Count all full-time (five or more courses/hours per day) teachers who teach three or more classes/hours per day in all other program areas. Do not count special education teachers.
Enter this total on the questionnaire.

3. TOTAL SALARIES FOR OCC TEACHERS / TOTAL SALARIES FOR GEN TEACHERS

TOTAL SALARIES FOR OCC TEACHERS - Total the individual salaries of the occupational education (full-time) teachers who make up the count entered under "Total Occ Ed Teachers" (see above).
Enter the total dollar amount on the questionnaire.

TOTAL SALARIES FOR GEN TEACHERS - Total the individual salaries of the general education (full-time) teachers who make up the count entered under "Total Gen Ed Teachers" (see above).
Enter the total dollar amount on the questionnaire.

4. CONSUMABLE SUPPLIES

Using data from your school's 1988-89 budget allocation, calculate the cost of consumable supplies separately for occupational education programs and classes (as defined in #1 above) and for general education classes (as defined in #1 above).
Enter the total dollar amount for occupational education and the total

dollar amount for general education on the questionnaire.

5. EQUIPMENT

Using data from your school's 1988-1989 budget allocation, calculate the cost of equipment purchased for occupational education programs and classes (as defined in #1 above) and for general education classes (as defined in #1 above).

Enter the total dollar amount for occupational education and the total dollar amount for general education on the questionnaire.

6. MAINTENANCE/REPAIR

This section applies to EQUIPMENT MAINTENANCE AND REPAIR. Total the costs of equipment maintenance and repair for occupational education programs and classes (as defined in #1 above) and for general education classes (as defined in #1 above). This information should be available from maintenance and operations departments.

Enter the total dollar amount for occupational education and the total dollar amount for general education on the questionnaire.

_____ SCHOOL DISTRICT
(Enter Name)

COST COMPARISONS BETWEEN OCCUPATIONAL EDUCATION AND GENERAL EDUCATION, GRADES 9-12

January 1989

PLEASE COMPLETE THE FOLLOWING

_____ SCHOOL
(Enter Name)

Occupational Educational Program	General Educational Program
Total Occ Ed Students = _____	Total Gen Ed Students = _____
Total Occ Ed Teachers = _____	Total Gen Ed Teachers = _____
Total Salaries for Occ Teachers = $_____	Total Salaries for Gen Teachers = $_____
Consumable Supplies = $_____	Consumable Supplies = $_____
Equipment = $_____	Equipment = $_____
Maintenance/Repairs = $_____	Maintenance/Repairs = $_____

_____ SCHOOL
(Enter Name)

Occupational Educational Program	General Educational Program
Total Occ Ed Students = _____	Total Gen Ed Students = _____
Total Occ Ed Teachers = _____	Total Gen Ed Teachers = _____
Total Salaries for Occ Teachers = $_____	Total Salaries for Gen Teachers = $_____
Consumable Supplies = $_____	Consumable Supplies = $_____
Equipment = $_____	Equipment = $_____
Maintenance/Repairs = $_____	Maintenance/Repairs = $_____